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Committee on the Peaceful Uses of Outer Space
Scientific and Technical Subcommittee
Fifty-third session
Vienna, 15-26 February 2016

Draft report

I. Introduction

1. The Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space held its fifty-third session at the United Nations Office at Vienna from 15 to 26 February 2016, under the chairmanship of V. K. Dadhwal (India).

2. The Subcommittee held [...] meetings.

A. Attendance

3. Representatives of the following [...] States members of the Committee attended the session: Algeria, Argentina, Australia, Austria, Belarus, Belgium, Bolivia (Plurinational State of), Brazil, Bulgaria, Burkina Faso, Cameroon, Canada, Chile, China, Colombia, Costa Rica, Cuba, Czech Republic, Ecuador, Egypt, El Salvador, France, Germany, Greece, Hungary, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Italy, Japan, Jordan, Kazakhstan, Kenya, Lebanon, Luxembourg, Malaysia, Mexico, Mongolia, Netherlands, Nigeria, Oman, Pakistan, Peru, Philippines, Poland, Portugal, Qatar, Republic of Korea, Romania, Russian Federation, Saudi Arabia, Slovakia, South Africa, Spain, Sri Lanka, Sudan, Sweden, Switzerland, Thailand, Tunisia, Turkey, Ukraine, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland, United States of America, Venezuela (Bolivarian Republic of) and Viet Nam.

4. At its 835th meeting, on 15 February, and at its 837th meeting, on 16 February, the Subcommittee decided to invite, at their request, observers for Angola, Cyprus, the Dominican Republic, Norway and Panama to attend the session and to address it, as appropriate, on the understanding that it would be without prejudice to further

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requests of that nature and that doing so would not involve any decision of the Committee concerning status.

5. At its 835th meeting, on 15 February, the Subcommittee decided to invite, at its request, the observer for the European Union to attend the session and to address it, as appropriate, on the understanding that it would be without prejudice to further requests of that nature and that doing so would not involve any decision of the Committee concerning status.

6. At its 837th meeting, on 16 February, the Subcommittee decided to invite, at its request, the observer for the Sovereign Military Order of Malta to attend the session and to address it, as appropriate, on the understanding that it would be without prejudice to further requests of that nature and that doing so would not involve any decision of the Committee concerning status.

7. Observers for the Office for Disarmament Affairs of the Secretariat, the International Civil Aviation Organization (ICAO), the International Telecommunication Union (ITU) and the World Meteorological Organization (WMO) attended the session.

8. The session was attended by observers for the following intergovernmental organizations with permanent observer status with the Committee: European Organisation for Astronomical Research in the Southern Hemisphere (ESO), European Space Agency (ESA), European Telecommunications Satellite Organization (EUTELSAT-IGO) and International Mobile Satellite Organization (IMSO).

9. The session was also attended by observers for the following non-governmental organizations having permanent observer status with the Committee: African Association of Remote Sensing of the Environment (AARSE), Association of Space Explorers (ASE), Regional Centre for Remote Sensing of North African States (CRTEAN), EURISY, European Space Policy Institute (ESPI), International Academy of Astronautics (IAA), International Association for the Advancement of Space Safety (IAASS), International Astronautical Federation (IAF), International Astronomical Union (IAU), International Institute of Space Law (IISL), International Society for Photogrammetry and Remote Sensing (ISPRS), International Space University (ISU), National Space Society (NSS), Prince Sultan bin Abdulaziz International Prize for Water (PSIPW), Scientific Committee on Solar-Terrestrial Physics (SCOSTEP), Secure World Foundation (SWF), Space Generation Advisory Council (SGAC) and World Space Week Association (WSWA).

10. At its 835th meeting, on 15 February, the Subcommittee decided to invite, at their request, the observers for the Organization for Economic Cooperation and Development (OECD) and the Organization on Space Technologies for Societal Applications (Canada-Europe-United States-Asia) (CANEUS), as well as observers for the Space Mission Planning Advisory Group (SMPAG) and International Asteroid Warning Network (IAWN), to attend the session and to address it, as appropriate, on the understanding that it would be without prejudice to further requests of that nature and that doing so would not involve any decision of the Committee concerning status.

11. A list of the representatives of States, United Nations entities and other international organizations attending the session is contained in A/AC.105/C.1/2016/INF/45.

B. Adoption of the agenda

12. At its 835th meeting, on 15 February, the Subcommittee adopted the following agenda:

1. Adoption of the agenda.
2. Election of the Chair
3. Statement by the Chair.
4. General exchange of views and introduction of reports submitted on national activities.
5. United Nations Programme on Space Applications.
6. Space technology for socioeconomic development in the context of the United Nations Conference on Sustainable Development and the post-2015 development agenda.
7. Matters relating to remote sensing of the Earth by satellite, including applications for developing countries and monitoring of the Earth's environment.
8. Space debris.
9. Space-system-based disaster management support.
10. Recent developments in global navigation satellite systems.
11. Space weather.
12. Near-Earth objects.
13. Use of nuclear power sources in outer space.
14. Long-term sustainability of outer space activities.
15. Examination of the physical nature and technical attributes of the geostationary orbit and its utilization and applications, including in the field of space communications, as well as other questions relating to developments in space communications, taking particular account of the needs and interests of developing countries, without prejudice to the role of the International Telecommunication Union.
16. Draft provisional agenda for the fifty-fourth session of the Scientific and Technical Subcommittee.
17. Report to the Committee on the Peaceful Uses of Outer Space.

C. Election of the Chair

13. At its 835th meeting, the Subcommittee elected V. K. Dadhwal (India), Chair of its fifty-third session and Chiaki Mukai (Japan), Chair of its fifty-fourth session, pursuant to General Assembly resolution 70/82 of 9 December 2015.

D. General statements

14. Statements were made by representatives of the following member States during the general exchange of views: Algeria, Argentina, Australia, Austria, Brazil, Canada, China, Colombia, Costa Rica, Cuba, Czech Republic, Ecuador, El Salvador, France, Germany, India, Indonesia, Iran (Islamic Republic of), Israel, Italy, Japan, Kenya, Mongolia, Mexico, Nigeria, Oman, Pakistan, Philippines, Poland, Portugal, Qatar, Republic of Korea, Russian Federation, South Africa, Sweden, Switzerland, Thailand, the United Arab Emirates the United Kingdom, United States and Venezuela (Bolivarian Republic of). Statements were also made by the representative of the Sudan on behalf of the Group of African States and by the representative of Dominican Republic on behalf of the Group of Latin American and Caribbean States. General statements were also made by the observers for AARSE, CRTEAN, ESA, ESPI, EURISY, IAA, IAF, ISU, ITU, SGAC, SWF and WSWA.

15. The Subcommittee heard the following scientific and technical presentations:

(a) "IAC-16", by the representative of Mexico;

(b) "Earth observations and contributions by GCOM-W" and "Outer space activities of Asia and the result of APRSAF-22", by the representatives of Japan;

(c) "Medium- and long-term development plan of civil space infrastructure in China", by the representative of China;

(d) "The role of Italian industry in space exploration" and "The Italian Space Agency ISS science directory", by the representatives of Italy;

(e) "Presentation of Netherlands space activities", by the representative of the Netherlands;

(f) "Russian space very long baseline interferometry missions: results and prospects", by the representative of the Russian Federation;

(g) "Czech space industry in space research and development", by the representative of the Czech Republic;

(h) "High altitude Mars analogue research: results from the AMADEE-15 glacier Mars simulation", by the representative of Austria;

(i) "Recent Indian space missions; update as of February 2016", by the representative of India;

(j) "Why an International Lunar Decade Campaign for Science, Exploration, and Development can make a difference", by the observer for NSS;

(k) "Space Generation: perspective from the next generation, 2016", by the observer for SGAC.

16. The Subcommittee welcomed El Salvador, Israel, Oman, Qatar, Sri Lanka and the United Arab Emirates as the newest State members of the Committee on the Peaceful Uses of Outer Space, which brought the membership of the Committee to 83 States.

17. At the 835th meeting, the Chair of the Subcommittee made a statement outlining the work of the Subcommittee at its current session. He brought to the attention of the Subcommittee several provisions of General Assembly resolution 70/82 pertaining to the current work of the Subcommittee and drew to the particular attention of the Subcommittee the fact that the General Assembly had emphasized the significant progress in the development of space science and technology and their applications that had enabled humans to explore the universe, and the extraordinary achievements made over the past 50 years in space exploration efforts and that in that regard, the General Assembly had recognized the unique platform at the global level for international cooperation in space activities represented by the Committee on the Peaceful Uses of Outer Space and its Scientific and Technical Subcommittee and Legal Subcommittee and assisted by the Office for Outer Space Affairs of the Secretariat. Further , the Chair stressed that research and development in space science and technology remained a fundamental prerequisite for any space application for the benefit of human development on Earth, for protecting and preserving the Earth and the space environment, and in any exploration efforts in the universe, and therefore the Committee and its subsidiary bodies stood at the forefront in bringing the world together in using that technology for peaceful purposes.

18. Also at the 835th meeting, the Director of the Office for Outer Space Affairs made a statement in which she reviewed the work carried out by the Office during the previous year and presented a detailed description of planned activities for the coming year, including outreach activities and cooperation and coordination with United Nations entities and international intergovernmental and non-governmental organizations. She provided a comprehensive account of the work of the Office in support of the objectives of the plan of work of the fiftieth anniversary of the United Nations Conference on the Exploration and Peaceful Uses of Outer Space in 2018 (UNISPACE+50). She stressed the current unfavourable financial situation of the Office and highlighted the importance of the availability of financial and other resources for the successful implementation of the programme of work of the Office. She also described the Office's work in coordinating activities among United Nations entities in the areas of sustainable development, global health, emerging issues in commercial space transportation and regulatory aspects of small satellites as examples of the successful implementation of the mandate of the Office.

19. The Subcommittee observed a minute of silence to mark the passing of Boutros Boutros-Ghali, the sixth Secretary-General of the United Nations, from January 1992 to December 1996.

20. Some delegations condemned the launch of a long-range ballistic missile by the Democratic People's Republic of Korea on 7 February 2016 despite the grave concern expressed by the international community and in violation of Security Council resolutions 1718 (2006), 1874 (2009), 2087 (2013) and 2094 (2013), as it contributed to that country's development of nuclear weapon delivery systems.

21. The Subcommittee noted with satisfaction that the Office continued to monitor and implement decisions and recommendations of the Security Council and General Assembly, which were relevant to its work and to activities performed by entities affiliated to the United Nations in accordance with the mandate by the Committee, as well the Office's collaboration with the Panel of Experts established by the Security Council resolution 1874 (2009).

22. The Subcommittee welcomed with satisfaction the adoption by the General Assembly of 2030 Agenda for Sustainable Development. In that connection, some delegations expressed the view that the General Assembly had made it clear that space technology had immense potential to benefit both developed and developing countries, and in that regard the United Nations would be required to promote equal, non-discriminatory access to outer space, irrespective of levels of social, economic or scientific development.

23. The Subcommittee agreed that the improvement of human development, prosperity and well-being required a global approach and thus there was an ample opportunity for all countries to participate in finding ways and means to better serve humanity through the peaceful uses of outer space, which could be achieved through closer collaboration and full support in knowledge-sharing and capacity-building among States on the basis of bilateral and multilateral cooperation.

24. The Subcommittee agreed that space science and technology were essential to successfully address the current and future challenges of social and economic development and sustainability, in particular communication and navigation systems, natural disaster management and emergency response, food security, climate change and natural resource management. In that connection, the Subcommittee emphasized the crucial role of space activities in supporting sustainable development, especially as regards the sustainability of economic growth, improvement in the quality of life and global environmental management.

25. Some delegations expressed the view that developing countries should benefit from space technologies, in particular to support their social and economic development; that it was necessary to promote cooperation to facilitate data exchange and the transfer of technology among States; and that training of scientists in developing countries was crucial for the free flow of scientific information and data exchange, increased capacity-building and the sharing of knowledge.

26. Some delegations expressed the view that the benefits of outer space activities were cross-cutting in terms of disaster management, agriculture, health, education and sustainable development.

27. Some delegations expressed the view that international and regional cooperation in the peaceful exploration and use of outer space for meeting global development goals was essential for States and thus it should be continuously strengthened within the context of the Committee and its Subcommittees, which should remain a central international forum for those matters. In that regard, it would be essential to explore different options for strengthening the capabilities of the Office for Outer Space Affairs, in order for it to actively contribute to the promotion of space science and technologies and their applications for the benefit of all States, in particularly developing States.

28. Some delegations reaffirmed the commitment of their countries to the peaceful use and exploration of outer space and emphasized the following principles: equal and non-discriminatory access to outer space and equal conditions for all States, irrespective of their level of scientific, technical and economic development; non-appropriation of outer space, including the Moon and other celestial bodies, by claim of sovereignty, use, appropriation, occupation or any other means; the commitment by States to the use of outer space exclusively for peaceful purposes, as a common heritage of humankind; the non-militarization of outer space, the non-placement of weapons in outer space, and its strict use for the improvement of living conditions and peace on the planet; and regional cooperation to promote the development of space activities.

29. Some delegations expressed the view that, given the impact of space activities on human life and the environment, as well as the current state of technological advances coupled with the increasingly prominent role played by new private actors, there should be greater coordination and interaction between the Scientific and Technical Subcommittee and the Legal Subcommittee in order to promote the progressive development of international law and its codification, as well as the establishment of binding international norms addressing issues which were critical in the use and exploration of outer space.

30. Some delegations expressed the view that any initiative related to the use of outer space should be addressed by the Committee and that the discussion within multilateral organizations with specific mandates was an essential condition for the development of binding legal instruments that contributed to the improvement of space law and that would allow the equal participation of all States. Those delegations were of the view that in relation to outer space, topical issues of international cooperation, such as space debris, exchange of information, notification mechanisms and long-term sustainability of outer space activities could not be subject to non-binding agreements negotiated outside the framework of the United Nations.

31. The Subcommittee commended the Office for Outer Space Affairs for its tireless efforts in the development of space applications and encouraged the Office to continue its constructive cooperation to facilitate availability and accessibility of space technology and space applications for all States.

32. The Subcommittee expressed its gratitude to Japan for organizing a seminar on the theme "Japanese unique technology for space activity", held on the margins of the current session of the Subcommittee.

E. National reports

33. The Subcommittee took note with appreciation of the reports submitted by Member States (A/AC.105/1100 and Add.1, A/AC.105/1100/Add.1/Rev.1 and conference room paper A/AC.105/C.1/2016/CRP.10) for its consideration under agenda item 4, "General exchange of views and introduction of reports submitted on national activities". The Subcommittee recommended that the Secretariat continue to invite Member States to submit annual reports on their space activities.

F. Symposium

34. In accordance with the agreement reached by the Subcommittee at its forty-fourth session, in 2007 (A/AC.105/890, annex I, para. 24), and at its fifty-second session, in 2015 (A/AC.105/1088, para. 274 and annex I, para. 8), a symposium organized by the Office for Outer Space Affairs on the topic "The role of industry in space exploration" was held on 15 February 2016.

35. The Subcommittee noted with satisfaction that the symposium was the tenth in a series of symposiums to strengthen the partnership with industry and, in that connection, commended the Office for Outer Space Affairs for its excellent work.

36. The symposium, which was organized in the form of presentations and discussions, was moderated by Steve Bochinger of Euroconsult and was opened and concluded with remarks by the Director of the Office for Outer Space Affairs. The presentations given at the symposium included the following: "Space exploration in the space economy" by Steve Bochinger of Euroconsult, "Space industry and space exploration in Europe" by Carlo Mirra of Airbus Defence and Space, "Space industry and space exploration in the United States" by Mark Skinner of Boeing, "Commercial space transportation" by Mark Sundahl of the International Space Policy Working Group of the Commercial Space Transportation Advisory Committee of the Federal Aviation Administration of the United States and "Space industry and space exploration in Japan" by Hiroshi Koyama of Mitsubishi Electric Corporation.

37. During the symposium, a presentation entitled "Role of the Chinese space industry in space exploration" was made by Fan Weina of the China Aerospace Science and Technology Corporation.

G. Adoption of the report of the Scientific and Technical Subcommittee

38. After considering the items before it, the Subcommittee, at its [...] meeting, on [...] February 2016, adopted its report to the Committee on the Peaceful Uses of Outer Space, containing its views and recommendations, as set out in the paragraphs below.

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IX. Near-Earth objects

1. In accordance with General Assembly resolution 70/82, the Scientific and Technical Subcommittee considered agenda item 12, "Near-Earth objects".

2. The representatives of China, Egypt, Germany, Indonesia, Japan, Mexico, Pakistan, the Republic of Korea, the Russian Federation and the United States, as well as the representative of Chile, on behalf of the Group of Latin American and Caribbean States, made statements under agenda item 12. In addition, statements were made by the observers for ASE, IAWN and SMPAG. During the general exchange of views, statements relating to the item were made by representatives of other member States.

3. The Subcommittee heard the following scientific and technical presentations:

(a) "IAWN report to the Scientific and Technical Subcommittee, 2016", by the observer for IAWN;

(b) "SMPAG report to the Scientific and Technical Subcommittee, 2016", by the observer for SMPAG.

4. The Subcommittee had before it a conference room paper entitled "Proposal for a proclamation of the International Asteroid Day: proposal submitted by the Association of Space Explorers" (A/AC.105/C.1/2016/CRP.11).

5. The Subcommittee noted with appreciation the strengthening of cooperation and coordination efforts at the global level for sharing information on discovering, monitoring and physically characterizing potentially hazardous near-Earth objects (NEOs) to ensure that all States, in particular developing countries with limited capacity in predicting and mitigating an NEO impact, were aware of potential threats.

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6. The Subcommittee heard presentations on cooperative projects and observation missions being undertaken, such as the JAXA sample return mission Hayabusa-2, scheduled to arrive at the target asteroid in 2018 and the sample return mission (Origins Spectral Interpretation Resource Identification Security Regolith Explorer) OSIRIS-Rex of the National Aeronautics and Space Administration (NASA) of the United States, to be launched in 2016. Furthermore, a number of international research projects were planned to explore asteroid mitigation technology options, such as the NEOShield-2 project, coordinated by Airbus Defense and Space and the joint ESA-NASA Asteroid Impact and Deflection Assessment (AIDA) mission, planned to have launch capability in 2019.

7. The Subcommittee took note of cooperation projects to enhance capabilities for the observation of NEOs, such as the establishment of the Asia-Pacific Asteroid Observation Network comprising 21 organizations in the Asia-Pacific region, the initiative for the establishment of a new regional centre in Asia for the international network providing risk assessments and the Deep Ecliptic Patrol of the Southern Sky (DEEP-South) project of the Korea Astronomy and Space Science Institute of the Republic of Korea.

8. The Subcommittee recalled the agreement that IAWN and SMPAG, established in 2014 as a result of the recommendations for an international response to the near-Earth object impact threat, which were endorsed by the Committee on the Peaceful Uses of Outer Space at its fifty-sixth session and welcomed by the General Assembly in its resolution 68/75, should provide annual reports, and agreed to invite IAWN and SMPAG to participate as observers in the sessions of the Subcommittee.

9. The Subcommittee heard reports by the chairs of IAWN and SMPAG on their activities and welcomed with appreciation the progress made by those two groups in the area of strengthening international cooperation in mitigating a potential NEO threat, which required cooperative action in the interest of public safety on the part of the global community.

10. The Subcommittee noted the progress by IAWN as an international association of institutions involved in detecting, tracking, and characterizing NEOs to provide the best information available on the NEO hazard and all impact threats, including its task of using well-defined communication plans and protocols to assist Governments in the analysis of the consequences of asteroid impact and to support the planning of mitigation responses. The Subcommittee noted that IAWN aimed to serve the global community as the authoritative source of accurate and up-to-date information on NEOs and NEO impact risks.

11. The Subcommittee noted that IAWN currently comprised six official signatories to the IAWN statement of intent, representing space institutions from Europe, Mexico, the Republic of Korea, the Russian Federation and the United States and an amateur observer from the United Kingdom. These signatories bring to bear a variety of ground- and space-based assets to detect and observe NEOs, as well as abilities in orbit computation, possible impact prediction and modelling of potential impact effects, and recognize the importance of being adequately prepared for communications with a variety of audiences about NEOs, close approaches and NEO impact risks.

12. The Subcommittee also noted that SMPAG held two meetings since the fifty-second session of the Subcommittee: the first one on the margins of the fourth

international Planetary Defense Conference held in Frascati, Italy, on 9 and 10 April 2015 and the second on the margins of the present session of the Subcommittee, on 16 and 17 February 2016.

13. The Subcommittee further noted that the first workplan document had been approved at the SMPAG steering committee meeting on the margins of the Division for Planetary Sciences on 10 November 2015. The workplan is a living document including completed, ongoing and planned activities and at present comprises 11 workplan items, for which eight task leaders had already been identified to coordinate the activities and three task leaders were still to be assigned.

14. The Subcommittee further noted that during the SMPAG meeting on the margins of this Subcommittee's session, the following had been achieved:

(a) The Korea Astronomy and Space Science Institute had been unanimously accepted as a new SMPAG member, bringing SMPAG membership to 16 official members;

(b) SMPAG unanimously endorsed a statement on the need for a NEO deflection demonstration mission;

(c) Status reports were given on all ongoing workplan items. In addition, splinter meetings were held on the subjects of mapping threat scenarios to mission types and criteria and thresholds for impact response actions;

(d) The Romanian Space Agency had offered to take the lead on the workplan item on criteria for deflection targeting, and SMPAG welcomed the offer and agreed on that assignment;

(e) An ad hoc working group on legal issues was discussed and it was agreed to establish it in order to, among other things, formulate and prioritize relevant legal issues and questions requiring clarification with regard to the work of SMPAG; consider the legal questions in the context of existing treaties; and devise a plan of action to tackle outstanding issues;

(f) ESA had been unanimously re-elected as the chair of SMPAG for the next two years in order to ensure the completion of the initial development phase of SMPAG.

15. The Subcommittee noted the need to establish a permanent secretariat of SMPAG in order to ensure the continuity of its work independent of the SMPAG rotating chairmanship and provide for institutional memory in terms of keeping documentation records and ensuring consistent annual reporting to the Committee on the Peaceful Uses of Outer Space.

16. In that regard the Subcommittee, recalling its earlier agreement that the work of IAWN and SMPAG should be facilitated by the United Nations, noted that SMPAG requested the Office for Outer Space Affairs to serve as the permanent secretariat of SMPAG on the understanding that there would be no implications to the budget of the United Nations.

17. The Subcommittee also noted that the work of IAWN and SMPAG, facilitated by the Office for Outer Space Affairs, was also linked in important ways to the process related to the fiftieth anniversary of the United Nations Conference on the Exploration and Peaceful Uses of Outer Space in 2018 (UNISPACE+50), which

aimed to reinforce some of the existing global coordination mechanisms working towards strengthening resiliency and the overall governance of space activities.

18. The Subcommittee also noted that the next meetings of the IAWN steering committee and the SMPAG steering committee would take place on the margins of the meeting of the Division for Planetary Sciences to be held from 16 to 21 October 2016, in Pasadena, United States.

19. The Subcommittee welcomed the proposal by ASE for a global observance of an International Asteroid Day, to be proclaimed by the General Assembly at its seventy-first session in 2016. Intended as an annual event held for the general public on the anniversary of the Tunguska impact over Siberia on 30 June 1908, the International Asteroid Day is intended to raise public awareness about the asteroid impact hazard and inform the public about the crisis communication actions to be taken at the global level in the case of a credible NEO threat; the work undertaken by SMPAG and IAWN, facilitated by the Office for Outer Space Affairs; and the work undertaken in that area by the Committee on the Peaceful Uses of Outer Space and its member States.

20. The Subcommittee noted with appreciation that IAWN and SMPAG organized an open forum lunchtime event on 18 February to present the status of their activities and engage in an open dialogue with member States, other Vienna-based organizations and the media. The open forum took the form of presentations given by IAWN and SMPAG representatives. Participants were given a leaflet with further information on IAWN and SMPAG, which served as a reference document for further information for Governments, the general public and the media, and would be translated into the six official languages of the United Nations and made available on the web page of the Office for Outer Space Affairs (www.unoosa.org). Further information on IAWN and SMPAG is available at http://iawn.net and http://smpag.net, respectively.

XIII. Use of nuclear power sources in outer space

21. In accordance with General Assembly resolution 70/82, the Subcommittee considered agenda item 13, "Use of nuclear power sources in outer space".

22. The representatives of Indonesia, France, the United States and Venezuela (Bolivarian Republic of) and the representative of Chile, on behalf of the Group of Latin American and Caribbean States, made statements under agenda item 13. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

23. The Subcommittee had before it the following:

(a) Draft report prepared by the Working Group on the Use of Nuclear Power Sources in Outer Space containing recommendations for potential future work to promote and facilitate implementation of the Safety Framework for Nuclear Power Source Applications in Outer Space (A/AC.105/C.1/L.349);

(b) Draft report on the implementation of the Safety Framework for Nuclear Power Source Applications in Outer Space and general recommendations for

potential future work, prepared by the Working Group on the Use of Nuclear Power Sources in Outer Space (A/AC.105/C.1/L.349/Rev.1);

(c) A conference room paper submitted by the United Kingdom entitled "Possible general safety recommendations to implement the Safety Framework for Nuclear Power Source Applications in Outer Space" (A/AC.105/C.1/2016/CRP.6);

(d) A conference room paper submitted by France entitled "Proposal to revise the Principles Relevant to the Use of Nuclear Power Sources in Outer Space adopted by the General Assembly in its resolution 47/68 of 14 December 1992" (A/AC.105/C.1/2016/CRP.7);

(e) A conference room paper submitted by China entitled "Safety practices of space nuclear power sources in China" (A/AC.105/C.1/2016/CRP.12).

24. The Subcommittee encouraged States and international intergovernmental organizations to begin or to continue implementing the Safety Framework for Nuclear Power Source Applications in Outer Space, as contained in document A/AC.105/934.

25. The Subcommittee also encouraged States and intergovernmental organizations involved in the use of nuclear power sources (NPS) in outer space to continue to share, in technical presentations to the Subcommittee, their NPS safety experiences and best practices.

26. Some delegations expressed the view that presentations and statements under this agenda item from member States and international intergovernmental organizations on their best practices in the use of space NPS helped to strengthen the commitments of the international community to safety of space NPS.

27. Some delegations expressed the view that the Safety Framework, in its present form, was not sufficient to meet the challenges posed by the use of NPS in outer space and that their proliferation in outer space, including in terrestrial orbits, should not be allowed, as the effects of NPS on humankind and the environment had not been assessed and there was no definite framework establishing responsibilities and introducing technical and legal tools that could effectively address critical situations that might arise because of improper practices.

28. The view was expressed that the Safety Framework would facilitate the conduct of missions involving NPS on a bilateral or multilateral basis by States and international intergovernmental organizations. The delegation expressing that view was also of the view that the widespread adoption of the Framework would provide assurance to the global community that space NPS applications were being developed, launched, and used in a safe manner, and in that connection, encouraging national implementation of the Safety Framework should remain a high priority of the Subcommittee.

29. The view was expressed that the Safety Framework continuously provided a comprehensive and sufficient foundation of guidance for Member States and international intergovernmental space organizations to develop and operate their own space NPS applications in a safe manner.

30. Some delegations expressed the view that the use of NPS in outer space should be as limited as possible and that, while they were needed for some interplanetary missions, no justification existed for their use in terrestrial orbits, for which other

sources of energy that were much safer and that had been proved to be efficient were available.

31. Some delegations expressed the view that more consideration should be given to the use of NPS in terrestrial orbits in order to address the problem of potential collisions of NPS objects and to the accidental re-entry of NPS into the Earth's atmosphere. Those delegations were of the view that more attention should be given to that matter through adequate strategies, long-term planning, regulations and the promotion of binding standards, as well as the Safety Framework for Nuclear Power Source Applications in Outer Space.

32. Some delegations were of the view that serious consideration should be given to the protection of the Earth's biosphere from potential risks associated with the relevant launch, operation and decommissioning of the applications of NPS.

33. The view was expressed that the Sun was a source of energy that could effectively serve present and future needs of humankind in the areas of satellite applications, such as Earth observation, science and telecommunications, including telehealth and tele-education.

34. The view was expressed that the proposal to revise the Principles, as contained in conference room paper A/AC.105/C.1/2016/CRP.7, was merited for the following reasons: (a) the scope of the Principles had become too restrictive and was no longer suited to current and future technological developments; (b) the Principle's reference framework for radiological protection had evolved; and (c) the revision of the Principles would make it possible to ensure greater consistency with the Safety Framework. The delegation expressing that view was also of the view that the Subcommittee's Working Group on the Use of Nuclear Power Sources in Outer Space could consider, at least in an exploratory way, the opportunity to reconsider the Principles, taking into account the arguments outlined above.

35. Some delegations expressed the view that there should be greater coordination and interaction between the Scientific and Technical Subcommittee and the Legal Subcommittee in order to develop binding legal instruments to define the responsibility of States in the use of NPS in outer space and to undertake research on ways and means of optimizing or substituting for the use of nuclear energy in outer space activities.

36. Some delegations expressed the view that the objectives of the Working Group's multi-year workplan should be in conformity with international law, the Charter of the United Nations and the United Nations treaties and principles on outer space, in particular the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.

37. Pursuant to General Assembly resolution 70/82, the Subcommittee, at its 835th meeting, on 15 February, reconvened its Working Group on the Use of Nuclear Power Sources in Outer Space under the chairmanship of Sam A. Harbison (United Kingdom).

38. The Working Group held [...] meetings. At its [...] meeting, on [...] February, the Subcommittee endorsed the report of the Working Group, which is contained in annex II to the present report.

XIV. Long-term sustainability of outer space activities

39. In accordance with General Assembly resolution 70/82, the Subcommittee considered agenda item 14, "Long-term sustainability of outer space activities", under the workplan contained in the report of the Committee on the Peaceful Uses of Outer Space at its fifty-second session and as extended by the Committee at its fifty-seventh session.

40. The representatives of Austria, Brazil, Canada, China, Cuba, Egypt, France, Germany, India, Japan, the Russian Federation, South Africa, Switzerland, the United Kingdom and the United States, as well as the representative of Chile on behalf of the Group of Latin American and Caribbean States, made statements under agenda item 14. During the general exchange of views, statements relating to the item were made by representatives of other member States.

41. The Subcommittee heard the following scientific and technical presentations:

(a) "The most recent Hungarian cosmic radiation measurement results in the stratosphere using stratospheric balloons and sounding rockets", by the representative of Hungary;

(b) "Space debris mitigation activities at ESA in 2015", by the representative of the European Space Agency;

(c) "International space governance", by the observer for IAASS.

42. The Subcommittee had before it the following:

(a) Working paper by the Chair of the Working Group on the Long-term Sustainability of Outer Space Activities containing a draft report of the Working Group on the Long-term Sustainability of Outer Space Activities (A/AC.105/C.1/L.343);

(b) Working paper submitted by the Russian Federation entitled "Time for the international community to decide whether it would support an effective set of solutions regarding the enhancement of the safety of space operations or wind up its work on this topic with inconclusive results devoid of any functional load and having marginal practical usefulness" (A/AC.105/C.1/L.345);

(c) Working paper submitted by the Russian Federation entitled "Russian assessment of the initiative and actions of the European Union to advance its draft code of conduct for outer space activities" (A/AC.105/C.1/L.346);

(d) Working paper submitted by the United States containing a proposal for an expert group on space objects and events (A/AC.105/C.1/L.347);

(e) Note by the Secretariat containing an updated set of draft guidelines for the long-term sustainability of outer space activities (A/AC.105/C.1/L.348);

(f) Conference room paper by the Chair of the Working Group on the Long-term Sustainability of Outer Space Activities containing ideas for the way forward on the draft set of guidelines for the long-term sustainability of outer space activities (A/AC.105/C.1/2016/CRP.3);

(g) Working paper submitted by China entitled "China's position paper on the issues of long term sustainability of outer space activities" (A/AC.105/C.1/2016/CRP.13);

(h) Working paper submitted by the Russian Federation entitled "Considerations on the sum total of prime requisites and factors that should shape the policy of international information-sharing serving safety of space operations" (A/AC.105/C.1/2016/CRP.14);

(i) Working paper submitted by the Russian Federation entitled "Reviewing opportunities for achieving the Vienna Consensus on Space Security encompassing several regulatory domains" (A/AC.105/C.1/2016/CRP.15).

43. In accordance with General Assembly resolution 70/82, the Working Group on the Long-term Sustainability of Outer Space Activities was reconvened under the chairmanship of Peter Martinez (South Africa).

44. The Subcommittee welcomed the progress made by the Working Group since its last session, in accordance with the terms of reference and methods of work of the Working Group. The Subcommittee also noted that an intersessional meeting of the Working Group was held in Vienna from 5 to 9 October 2015.

45. Some delegations stressed the importance of accomplishing the work of the Working Group within the time frame outlined in the revised workplan. Those delegations also expressed the view that the work of the Working Group and its Chair had been conducted in an open, fair, transparent and inclusive manner.

46. Some delegations expressed the view that it was important to continue to consider interrelationships between the work of the Working Group and the recommendations contained in the report of the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities (A/68/189).

47. The view was expressed that transparency and confidence-building measures in outer space activities were critical for maintaining the long-term sustainability of the peaceful uses of outer space, particularly regarding recommendations for information exchange, notifications on registration of space objects and capacity-building.

48. The view was expressed that the guidelines on the long-term sustainability of outer space activities would form part of a broader context of measures aimed at fostering the sustainable use of outer space, and that they were intended to support and complement guidance available in existing treaties, principles, guidelines and recommendations.

49. Some delegations expressed the view that the United Nations was the only appropriate setting for the creation of guidelines on the long-term sustainability of outer space activities.

50. Some delegations expressed the view that the draft guidelines should take into consideration the needs of developing countries and encourage their participation in space activities, while at the same time not limiting their access to outer space.

51. Some delegations expressed the view that the guidelines for the long-term sustainability of outer space activities must include provisions to both define

sustainability itself, and to clearly prohibit the placement of weapons in outer space. These delegations also expressed the view that the long-term sustainability of outer space activities unequivocally depended on the non-militarization and non-placement of weapons in outer space.

52. The view was expressed that a guideline should be included that would encourage States to commit themselves, in their national legal frameworks, to conducting activities of an exclusively peaceful nature in the outer space environment.

53. Some delegations expressed the view that new guidelines should not create new costs or impose technical barriers for developing countries whose activities had made little or no contribution to the current space environment.

54. Some delegations expressed the view that the guidelines should be a living document to be modified in line with future technological developments.

55. Some delegations expressed support for the proposal put forward by the United States in its working paper A/AC.105/C.1/L.347 to establish an expert group to examine aspects of the long-term sustainability of outer space activities on which consensus had not yet been reached.

56. The view was expressed that space debris had been created through past space operations by countries with advanced space capabilities, and that those States should help new entrants in space activities to mitigate space debris by providing scientific, technological and financial support, in the interest of the long-term sustainability of outer space activities.

57. The view was expressed that the voluntary draft guidelines developed through "soft law" processes under the auspices of the United Nations should be consistent with international law, including the five United Nations treaties on outer space.

58. The view was expressed that the guidelines should include practical measures and realistic guidance regarding the use of existing technology to address actual and urgent problems faced when conducting activities in outer space.

59. The view was expressed that legal issues on the long-term sustainability of outer space activities should be discussed in the Legal Subcommittee.

60. The view was expressed that it was difficult to reach consensus on the draft guidelines because of serious political reasons not related to technical considerations. That delegation also expressed the view that during the negotiations on establishing a draft set of guidelines for the long-term sustainability of outer space activities under the auspices of the United Nations, other interested States improperly joined together to advance an alternative international code of conduct for space activities in an effort to bypass the work of the Committee.

61. The view was expressed that the desire for States to work outside the auspices of the United Nations was motivated by their unwillingness to engage in negotiations on topics duly proposed by the Russian Federation relating to the legitimate use of force and the right of self-defence, enshrined in the Charter of the United Nations.

62. Some delegations emphasized that the following principles should govern outer space activities: freedom of access to space for peaceful uses; preservation of

security and integrity of satellites in orbit and, in general, of the long-term sustainability of outer space activities; and compliance with the provisions of the Charter of the United Nations, including the right of self-defence.

63. The view was expressed that the guidelines should not contain references to the legitimate use of force, or the threat of the use of force, in outer space activities or to the Charter of the United Nations, as such references were already implicit rights of all States, and that it would set a dangerous precedent for a requirement to enumerate all such rights.

64. The view was expressed that it would not be possible to ensure the long-term sustainability of outer space or to resolve conflict if multilateral attempts to regulate the safety of outer space activities were allowed to expire.

65. The Subcommittee noted that the General Assembly, in accordance with paragraph 6 of its resolution 69/38, convened a joint ad hoc meeting of the Disarmament and International Security Committee (First Committee) and the Special Political and Decolonization Committee (Fourth Committee) on 22 October 2015 to address possible challenges to space security and sustainability.

66. At its [...] meeting, on [...] February, the Subcommittee endorsed the report of the Working Group on the Long-term Sustainability of Outer Space Activities, which is contained in annex III to the present report.

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VIII. Space weather

1. In accordance with General Assembly resolution 70/82, the Scientific and Technical Subcommittee considered agenda item 11, "Space weather".

2. The representatives of Canada, China, Egypt, Germany, Indonesia, Japan, Nigeria, Pakistan, the Republic of Korea and the United States made statements under agenda item 11. During the general exchange of views, statements relating to the item were made by representatives of other member States.

3. The Subcommittee heard the following scientific and technical presentations:

(a) "An update on SCOSTEP activities", by the observer for SCOSTEP;

(b) "Real-time acquisition of plasmaspheric electron densities by a global network for space weather investigations", by the representative of Hungary;

(c) "National space weather strategy", by the representative of the United States;

(d) "CALLISTO and the e-Callisto network", by the representative of Switzerland;

(e) "Italian contribution to space weather", by the representative of Italy;

(f) "An international road map to advance scientific understanding of space weather, commissioned by COSPAR and ILWS", by the observer for COSPAR;

(g) "Space weather study and high-resolution observations of the Sun with ARKA small explorer", by the representative of the Russian Federation;

(h) "Global warming and negative impacts on Egypt", by the representative of Egypt.

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4. The Subcommittee had before it the following:

(a) Report on the United Nations/Japan Workshop on Space Weather: Science and Data Products from International Space Weather Initiative Instruments (Fukuoka, Japan, 2-6 March 2015) (A/AC.105/1096);

(b) A conference room paper entitled "Space weather workshop and second meeting of Space Weather Expert Group, 15 to 17 February 2016: Report on work and review of work plan of the Space Weather Expert Group" (A/AC.105/C.1/2016/CRP.17), submitted by the rapporteur of the Expert Group on Space Weather.

5. The Subcommittee noted that space weather was a shared concern and that it was imperative to build on current international cooperative efforts and for countries around the globe to participate in monitoring space weather events from space and the ground, in order to be able to understand the drivers of space weather and to mitigate its negative effects on space-based and ground-based technological infrastructure and on human lives. That required continuous space-based and ground-based measurements and focused research that would lead to improvements in the modelling and forecasting capabilities of space weather events over time.

6. The Subcommittee took note of the progress made to advance space weather capabilities at the national level, including through the development of national space weather strategies and action programmes to enhance space weather preparedness, and also took note of progress in building space weather information and forecast systems at the national, regional and international levels.

7. The Subcommittee noted with appreciation the work done by the Expert Group on Space Weather, under the leadership of Canada, as one of the important mechanisms at the global level for enhancing space weather capabilities, drawing on the best practices of the work of expert group C, on space weather, of the Working Group on the Long-term Sustainability of Outer Space Activities, as well as on the work completed within the Committee on Space Research (COSPAR)/International Living With a Star (ILWS) Space Weather Road Map. That work was vital for strengthening the overall reliability of space systems and the ability of such systems to respond to the impact of adverse space weather, which was one of the priorities of the UNISPACE+50 process.

8. At the 843rd meeting of the Subcommittee, the Rapporteur of the Expert Group on Space Weather presented the progress made in the Expert Group since its establishment at the fifty-second session of the Subcommittee, in 2015, and the progress made during the second meeting of the Expert Group, which had been held on the margins of the Subcommittee's current session. The Rapporteur referred to the detailed written report of the work of the Expert Group, which also contained a review of its workplan (A/AC.105/C.1/2016/CRP.17).

9. The Expert Group noted the increasing number of Member States conducting risk assessments and socioeconomic studies on the effects of space weather and recognized the value to Member States in undertaking those assessments to inform their future actions to protect critical infrastructure. The Expert Group also examined the COSPAR-ILWS road map team report entitled "Understanding space weather to shield society" and endorsed the approach outlined in that report.

10. The Expert Group agreed to continue to meet annually on the margins of the session of the Scientific and Technical Subcommittee and to use teleconferences or other means to engage with each other intersessionally. Over the coming year, the Expert Group intended, as its priority task, to continue its work assessing the impact of geomagnetically induced currents on electrical power grids. Members of the Expert Group would seek to actively engage with national critical infrastructure protection agencies and national and international electrical power distribution organizations to be able to better understand, characterize and ultimately examine steps to mitigate space weather damage to that critical infrastructure.

11. The Subcommittee noted that, alongside the meeting of the Expert Group on Space Weather, a space weather workshop had been organized. The Workshop provided background information for reviewing the current space weather activities in member States and related national and international organizations. That enabled the Expert Group to assess the role of those organizations in the global space weather effort, with the aim of promoting coordination and communication among them.

12. The Subcommittee expressed appreciation for the United Nations Programme on Space Applications and its Basic Space Science Initiative, under which space weather activities were conducted. In that regard, the Subcommittee noted with appreciation the outcomes of the United Nations/Japan Workshop on Space Weather held in Fukuoka, Japan, from 2 to 6 March 2015, as contained in the report A/AC.105/1096, in particular the work of the International Space Weather Initiative (ISWI) steering committee to address data policy and usage for the benefit of international community. The Subcommittee noted that that steering committee had held its annual meeting on 19 February 2016, on the margins of the current session of the Subcommittee.

13. The Subcommittee noted the holding of several space weather workshops at the international, regional and national levels that demonstrated capabilities in space weather research, such as the international workshop on space weather and Earth's surface phenomena, held in Ota, Nigeria, from 11 to 15 May 2015. Furthermore, the Subcommittee noted that the Korean Space Weather Center would host the fourth Asia Oceania Space Weather Alliance conference, in November 2016.

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III. Space technology for socioeconomic development in the context of the United Nations Conference on Sustainable Development and the post-2015 development agenda

1. In accordance with General Assembly resolution 70/82, the Subcommittee considered agenda item 6, "Space technology for socioeconomic development in the context of the United Nations Conference on Sustainable Development and the post-2015 development agenda".

2. The representatives of Argentina, Egypt, Germany, Japan and South Africa, as well as the representative of Chile, on behalf of the Group of Latin American and Caribbean States, made statements under agenda item 6. During the general exchange of views, statements relating to the item were made by representatives of other member States.

3. The Subcommittee heard the following scientific and technical presentations:

(a) "SpacePharma", by the representative of Israel;

(b) "DLR contributions to face global challenges: protection of the environment, climate change, disaster management", by the representative of Germany;

(c) "Increasing food security by using satellite-enhanced crop insurance and disaster management", by the representative of Switzerland;

(d) "Samara State Aerospace University: potential for cooperation with scientific and educational centres in developing countries", by the representative of the Russian Federation;

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(e) "Nile River and sustainable development in Egypt", by the representative of Egypt;

(f) "Space-related activities of OECD", by the observer for the Organization for Economic Cooperation and Development (OECD).

4. The Subcommittee had before it the following documents:

(a) Note by the Secretariat entitled "Fiftieth anniversary of the United Nations Conference on the Exploration and Peaceful Uses of Outer Space: theme of the sessions of the Committee on the Peaceful Uses of Outer Space, its Scientific and Technical Subcommittee and its Legal Subcommittee in 2018" (A/AC.105/L.297);

(b) Conference room paper entitled "UNISPACE+50 thematic priorities: proposal submitted by the Steering Committee of UNISPACE+50" (A/AC.105/C.1/2016/CRP.18);

(c) Conference room paper entitled "Report of the expert group on space and global health" (A/AC.105/C.1/2016/CRP. 21).

5. The Subcommittee noted that 2015 had been a milestone year during which the international community had adopted mutually interdependent and strategic agendas, the Sendai Framework for Disaster Risk Reduction 2015-2030, the 2030 Agenda for Sustainable Development and the Paris Agreement on climate change.

6. In that regard, the Subcommittee recalled that the General Assembly, in its resolution 70/82, had expressed its conviction that space science and technology and their applications, such as satellite communications, Earth observation systems and satellite navigation technologies, provided indispensable tools for viable long-term solutions for sustainable development and could contribute more effectively to efforts to promote the development of all countries and regions of the world, stressing the need to harness the benefits of space technology towards implementing the 2030 Agenda for Sustainable Development.

7. The Subcommittee recalled that in 2015, the Committee on the Peaceful Uses of Outer Space had endorsed the workplan for the UNISPACE+50 process, as contained in document A/AC.105/L.297, which would provide a further opportunity for the Committee and its subsidiary bodies to build on the global development agenda, as adopted by the three global summits in 2015.

8. Some delegations expressed the view that UNISPACE+50 provided a timely opportunity to strengthen international cooperation in the peaceful uses of outer space and capacity-building in that area, in particular for the benefit of developing countries.

9. Some delegations expressed the view that advances in space science and technology and the rapid evolution of the space agenda, taken together with changes in the concept of space security and the presence of new space actors, including the expansion of the commercial sector, all posed new challenges. In order to address them effectively, consideration should be given to the creation of new legally binding instruments and other mechanisms, such as guidelines, codes and other transparency and confidence-building measures, with the joint aim of finding solutions to the problems faced by humanity, including in the context of sustainable

development. Those delegations were also of the view that meeting those challenges would require the strengthening of the role of the Committee on the Peaceful Uses of Outer Space and the Office for Outer Space Affairs.

10. The Subcommittee noted that space science and technology and their applications, as important enablers of economic, social and cultural development and contributors to, in particular, poverty eradication, held immense potential to benefit both developed and developing countries and had a central role to play in achieving the goals of the 2030 Agenda for Sustainable Development.

11. In that regard, the Subcommittee noted the ongoing efforts by the international community to implement the 2030 Agenda for Sustainable Development, including the adoption of the African Space Policy and Strategy by the African Union Heads of State and Government during the twenty-sixth session of the African Union, held in Addis Ababa on 31 January 2016.

12. The Subcommittee noted the crucial role of Earth observation data, compiled at the local, regional and global levels, which provided for sound decision-making and for early warning measures in the event of epidemics and infectious diseases. In this regard, the Subcommittee reaffirmed the importance of the work of the Expert Group on Global Health and Space, established by the Subcommittee in 2014.

13. The Subcommittee noted with appreciation the e-publication *Space for Agriculture Development and Food Security*, which built upon the efforts of the Inter-Agency Meeting on Outer Space Affairs in those areas and had been prepared by the Office for Outer Space Affairs and made available on its website at www.unoosa.org.

14. The Subcommittee also commended the Office for Outer Space Affairs for having launched a series of high-level forums (2016-2018) on the theme "Space as a driver for socioeconomic sustainable development", a timely and pertinent initiative aimed at creating a platform for the international community to further explore the contributions of space science and technology to global development as well as an opportunity to forge new partnerships and set new frameworks of international cooperation in the lead-up to UNISPACE+50 in 2018.

15. The Subcommittee noted that the European Space Policy Institute was planning a series of dialogues in 2016 on space for sustainable development in order to engage various actors, ranging from spacefaring and non-spacefaring countries to non-governmental entities.

16. The Working Group of the Whole was reconvened under the chairmanship of Chiaki Mukai (Japan), in accordance with paragraph 8 of General Assembly resolution 70/82. At its [...] meeting, on [...] February, the Subcommittee endorsed the report of the Working Group of the Whole, which is contained in annex I to the present report.

V. Space debris

17. In accordance with General Assembly resolution 70/82, the Subcommittee considered agenda item 8, "Space debris".

18. The representatives of China, Egypt, France, Germany, India, Indonesia, Italy, Japan, Pakistan, the Republic of Korea, the Russian Federation, the United States and Venezuela (Bolivarian Republic of) made statements under agenda item 8. A statement was made under the item by the representative of Chile on behalf of the Group of Latin American and Caribbean States. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

19. The Subcommittee heard the following scientific and technical presentations:

(a) "United States space debris environment, operations and modelling updates", by the representative of the United States;

(b) "The Inter-Agency Space Debris Coordination Committee (IADC): an overview of IADC annual activities" and "One Web", by the representatives of the United Kingdom;

(c) "Overview of space debris-related activities in France in 2015", by the representative of France;

(d) "Recent developments of the International Scientific Optical Network project", by the representative of the Russian Federation.

20. The Subcommittee had before it the following documents:

(a) Information on national research on space debris, the safety of space objects with nuclear power sources on board and problems relating to the collision of such objects with space debris, in replies received from Member States and international organizations (A/AC.105/C.1/110 and A/AC.105/C.1/2016/CRP.8);

(b) Conference room paper entitled "Compendium of space debris mitigation standards adopted by States and international organizations" (A/AC.105/C.1/2016/CRP.9);

(c) Conference room paper entitled "International cooperation in the peaceful uses of outer space: activities of Member States" (A/AC.105/C.1/2016/CRP.10), containing a reply by the Czech Republic regarding international cooperation in the field of space debris mitigation.

21. The Subcommittee expressed concern at the increasing amount of space debris and encouraged those States, including agencies, industries and academia, which had not yet done so to consider voluntary implementation of the Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space.

22. The Subcommittee agreed that States, in particular spacefaring nations, should pay greater attention to the problem of collisions of space objects, including those with nuclear power sources on board, with space debris and to other aspects of space debris, including its re-entry into the atmosphere. In this regard, the Subcommittee encouraged continuous reporting by States on the status of their implementation of the Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space.

23. The Subcommittee noted with satisfaction that some States were implementing space debris mitigation measures consistent with the Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space and/or the

IADC Space Debris Mitigation Guidelines and that a number of States had developed their own space debris mitigation standards based on those guidelines.

24. The Subcommittee noted that other States were using the IADC Guidelines and the European Code of Conduct for Space Debris Mitigation as reference points in their regulatory frameworks for national space activities. The Subcommittee also noted that other States had cooperated, in the framework of the European Union-funded space surveillance and tracking support framework and the European Space Agency space situational awareness programme, in addressing the issue of space debris.

25. The Subcommittee noted with appreciation that States had adopted a number of approaches and concrete actions to mitigate space debris, including the improvement of the design of launch vehicles and spacecraft, the reorbiting of satellites, passivation, end-of-life operations and the development of specific software and models for space debris mitigation.

26. The Subcommittee noted that research and implementation were being conducted in the areas of the development and improvement of space debris mitigation, modelling and measurement, as well as technology for space debris observation and continuous monitoring, space debris re-entry and fragmentation prediction and notification, collision avoidance and modelling of collision probability, in-orbit robotic servicing of satellites, space debris removal, and technologies to protect space systems from space debris and to limit the creation of additional space debris.

27. The Subcommittee acknowledged the continuing work of IADC, whose initial work served as the basis for the Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space, and noted that IADC continued its work to characterize the space debris environment and evaluate improvements to its own space debris mitigation guidelines.

28. The view was expressed that, notwithstanding the Space Debris Mitigation Guidelines, the orbital environment had been deteriorating such that the situation had become critical, and it was increasingly apparent that space debris mitigation activities should be further encouraged. The delegations expressing that view also stated that the recent situation showed that measures to protect even unmanned orbital spacecraft from damage caused by space debris impact were crucial, as once a collision with large debris had occurred, the orbital environment could quickly deteriorate further, and even tiny debris could cause loss of function in a spacecraft, potentially inviting fragmentation or collision.

29. Some delegations expressed the view that it was necessary to continue to improve the Space Debris Mitigation Guidelines of the Committee and that the Scientific and Technical Subcommittee and the Legal Subcommittee should cooperate with the aim of developing legally binding rules relating to space debris, including debris derived from space platforms with nuclear power sources on board.

30. Some delegations expressed the view that outcomes of the work of the working groups of the Subcommittee, such as the Safety Framework for Nuclear Power Source Applications in Outer Space and the Space Debris Mitigation Guidelines of the Committee, should be officially presented to the Legal Subcommittee for examination.

31. Some delegations expressed the view that the Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space remained useful in the effort to achieve worldwide acceptance and implementation of space debris mitigation measures. The delegations expressing that view called on all spacefaring nations and organizations around the world to implement the Guidelines in their space system designs and operations with a view to limiting the generation of space debris.

32. Some delegations expressed the view that the exchange of knowledge, data and analysis methods among States was essential for meaningful mitigation strategies and remediation measures.

33. Some delegations expressed the view that since space debris had been created by past operations of spacefaring countries, those countries should assist countries with emerging space programmes in the implementation of space debris mitigation measures through the provision of conjunction assessment risk analysis and situational awareness systems for the live monitoring of space objects, providing scientific and technological support, including the transfer of relevant technology, without imposing undue costs on the space programmes of the developing nations.

34. The view was expressed that a mechanism should be developed to assist emerging spacefaring nations that did not have the necessary financial and technological resources to comply with the set of the Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space.

35. The view was expressed that coordinated efforts were required to deal with the technological and financial aspects of debris removal.

36. The view was expressed that recent developments in the field of small satellites, as well as announcements by private companies to launch large constellations of satellites, had raised questions about their potential impact on the space debris environment in the short and long terms. The delegation expressing that view informed the Subcommittee that initial studies had indicated that the long-term environmental impact of constellations greatly depended on the degree of compliance with existing mitigation guidelines, in particular with regard to the end-of-life disposal of constellation members.

37. The Subcommittee noted with satisfaction that the compendium of standards adopted by States and international organizations to mitigate space debris, initiated by Canada, the Czech Republic and Germany, was continuously maintained and updated on the website of the Office for Outer Space Affairs, and encouraged Member States to provide their contributions or updates to the compendium.

38. The Subcommittee took note of paragraph 11 of General Assembly resolution 70/82, and agreed that Member States and international organizations with permanent observer status with the Committee should continue to be invited to provide reports on research on space debris, the safety of space objects with nuclear power sources on board, problems relating to the collision of such space objects with space debris and ways in which debris mitigation guidelines were being implemented.

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VI. Space-system-based disaster management support

1. In accordance with General Assembly resolution 70/82, the Subcommittee considered agenda item 9, "Space-system-based disaster management support".

2. The representatives of Algeria, China, Egypt, Germany, India, Indonesia, Italy, Japan, Mexico, Pakistan, the Republic of Korea, the Russian Federation, Sri Lanka, the United States and Venezuela (Bolivarian Republic of) made statements under agenda item 9. A statement was also made under the item by the representative of Chile on behalf of the Group of Latin American and Caribbean States. A representative of the Office for Outer Space Affairs made a statement on the activities of the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER). The representative of CANEUS International made a statement on its Global-Sat initiative to coordinate a number of satellite constellations in support of the Sendai Framework for Disaster Risk Reduction 2015-2030. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

3. The Subcommittee heard the following scientific and technical presentations:

(a) "German Aerospace Center (DLR) contributions to face global challenges: protection of the environment, climate change and disaster management", by a representative of Germany;

(b) "Increasing food security by using satellite-enhanced crop insurance and disaster management", by a representative of Switzerland;

(c) "Synergic use of COSMO-SkyMed and Sentinel data for disaster management support", by a representative of Italy;

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(d) "Global warming and negative impacts on Egypt", by a representative of Egypt.

4. The Subcommittee had before it the following:

(a) Report on the United Nations/Germany International Conference on Earth Observation: global solutions for the challenges of sustainable development in societies at risk, held in Bonn, Germany, from 26 to 28 May 2015 (A/AC.105/1097);

(b) Report on the knowledge portal of the United Nations Platform for Space-based Information for Disaster Management and Emergency Response: recent advances (A/AC.105/1101);

(c) Report on the United Nations International Conference on Space-based Technologies for Disaster Management: a consolidating role in the implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030, held in Beijing from 14 to 16 September 2015 (A/AC.105/1102);

(d) Report on joint activities carried out in 2015 by the regional support offices of the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (A/AC.105/1103);

(e) Report on activities carried out in 2015 in the framework of the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (A/AC.105/1105);

(f) Note by the Secretariat entitled "UN-SPIDER: strengthening drought early warning systems in Central America and the Dominican Republic" (A/AC.105/C.1/2016/CRP.19).

5. The Subcommittee expressed its appreciation for the efforts of the Office for Outer Space Affairs to bring the reports on the activities of UN-SPIDER in 2015 to its attention, and noted with satisfaction the progress made with regard to activities planned in the framework of UN-SPIDER, including the continuing advisory support and other support provided through it for emergency response efforts. Some delegations informed the Subcommittee that they were implementing recommendations emanating from the technical advisory services of UN-SPIDER.

6. The Subcommittee noted that in 2015, UN-SPIDER, with the continued support of its network of partners, had carried out missions for advisory support and assessment in Gabon, Honduras and the Lao People's Democratic Republic, as well as an expert mission to El Salvador. The Subcommittee noted with satisfaction the capacity-building efforts in the form of training sessions held in Bangladesh, Bhutan, China, Colombia, Mexico, South Africa and the United States, addressing concrete requirements and providing follow-up to the UN-SPIDER technical advisory missions carried out in previous years.

7. The Subcommittee also acknowledged with appreciation the progress and developments with respect to the UN-SPIDER knowledge portal (www.un-spider.org), in particular the availability of multiple language versions.

8. The Subcommittee took note of the more than 20 activities planned for 2016, to be reported on in detail at the next session of the Subcommittee, and noted the synergies and cross-border actions facilitated by the UN-SPIDER programme. It

also took note of other capacity-building sessions planned and emphasized the need for increased capacity-building support in the various regions.

9. The Subcommittee welcomed the planned outreach activities of UN-SPIDER and its developing partnerships with United Nations entities, international organizations and Governments to continue promoting the use of space-based tools and information in global and regional initiatives, such as under the Sendai Framework for Disaster Risk Reduction 2015-2030 and the 2030 Agenda for Sustainable Development. It also noted that more complementary relationships between UN-SPIDER and other initiatives should be established and existing relationships strengthened, including with Sentinel Asia.

10. The Subcommittee noted with satisfaction the ongoing activities of member States to increase the availability and use of space-based solutions in support of disaster risk reduction, particularly in the context of the Sendai Framework for Disaster Risk Reduction 2015-2030, and also in support of the UN-SPIDER programme. Those activities included promoting emergency observation in the event of natural or technological disasters under the Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters (also referred to as the International Charter on Space and Major Disasters) and in the framework of the Sentinel Asia programme. They also included the support given by the DLR Center for Satellite-based Crisis Information for several operational mapping and analysis tasks for disaster events worldwide, including the contribution of satellite data for use in several of the International Charter activations.

11. The Subcommittee also noted with satisfaction other activities of member States in the same area, such as the promotion, with the support of UN-SPIDER, of the International Charter's universal access initiative, the provision of national or regional data portals for the dissemination of information in near-real time such as the national support centre for satellite information applications of the Republic of Korea, and the production of risk assessments and mapping based on space-based information. Further activities included the support provided through the Regional Visualization and Monitoring System programmes in the Himalayas and Africa funded by the United States, such as the establishment of a new node in Niger; and other examples of products defined for specific and sectoral end users at the national level.

12. The Subcommittee noted with satisfaction the activities conducted by several member States, directly or through the International Charter, to facilitate access to satellite imagery and space-based information to support the response effort following the Nepal earthquake of May 2015.

13. The Subcommittee noted that the International Charter had been activated over 470 times since its creation, and 39 times in 2015 alone. The Subcommittee also noted that Sentinel Asia had been activated 22 times for disasters including typhoons, floods, earthquakes, volcanic eruptions and landslides.

14. The Subcommittee noted the efforts conducted by several member States through the Committee on Earth Observation Satellites, in particular in the context of its working group on disasters.

15. Some delegations expressed the view that partnerships, international agreements and full and open data-sharing arrangements were becoming increasingly important to ensure the effective distribution of space-based data and their use by emergency managers and other authorities worldwide. Various services offered by space agencies were noted, such as the provision of current satellite imagery and information ready for use in geographic information systems.

16. Some delegations indicated that they supported the declaration signed in Mexico City on 18 September 2015 at the summit of the heads of space agencies on climate change and disaster management, organized by the International Academy of Astronautics.

17. Some delegations commented on the networks of satellites currently in operation that supported disaster management efforts. They made reference to upcoming missions to launch new satellites for these types of applications.

18. The view was expressed that space-based data can be beneficial in many more disaster situations, not only sudden-onset but also slow-onset disasters, and that more support was needed to make space-based data widely available for monitoring events related to terrorism.

19. The Subcommittee noted the in-kind contributions made by member States and regional support offices in 2015, including the provision of experts, to all UN-SPIDER technical advisory missions and related activities, and of their efforts to share experiences with other interested countries.

20. The Subcommittee noted with great appreciation the voluntary contributions that were being made by member States, including the cash contributions from Austria, China, Germany and Switzerland, and again encouraged other member States to provide UN-SPIDER voluntarily with all necessary support, including increased financial support, to enable it to better respond to Member States' requests for assistance and to fully carry out its workplan for the next biennium.

VII. Recent developments in global navigation satellite systems

21. In accordance with General Assembly resolution 70/82, the Subcommittee considered agenda item 10, "Recent developments in global navigation satellite systems", and reviewed issues related to the International Committee on Global Navigation Satellite Systems (ICG), the latest developments in the field of global navigation satellite systems (GNSS) and new GNSS applications.

22. The representatives of China, India, Japan, the Russian Federation, Pakistan and the United States made statements under agenda item 10. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

23. The Subcommittee had before it the following:

(a) Note by the Secretariat on the tenth Meeting of the International Committee on Global Navigation Satellite Systems (A/AC.105/1104);

(b) Report of the Secretariat on activities carried out in 2015 in the framework of the workplan of the International Committee on Global Navigation Satellite Systems (A/AC.105/1106);

(c) Report on the United Nations/Russian Federation workshop on the applications of global navigation satellite systems (A/AC.105/1098).

24. The Subcommittee noted with appreciation the achievements of providers and users of positioning, navigation and timing services in promoting GNSS, as reflected in the publication *International Committee on Global Navigation Satellite Systems: The Way Forward — 10 Years of Achievement 2005-2015* (ST/SPACE/67).

25. The Subcommittee was informed that the Office for Outer Space Affairs, as the executive secretariat of ICG, handled coordination for the planning of meetings of ICG and its Providers' Forum in conjunction with sessions of the Committee and its subsidiary bodies. It was noted that the executive secretariat also maintained a comprehensive information portal for ICG and users of GNSS services and continued to play an active role in promoting international cooperation to use the capabilities of GNSS in order to support sustainable development.

26. The Subcommittee also noted that the regional centres for space science and technology education, affiliated to the United Nations, which also served as information centres for ICG and its Providers' Forum, were working towards the establishment of a network of institutions involved or interested in GNSS. They were also identifying new applications that could be developed in the regions on the basis of GNSS services.

27. The Subcommittee noted that a United Nations/Russian Federation workshop on the applications of global navigation satellite systems had been held in Krasnoyarsk, Russian Federation, from 18 to 22 May 2015. The main objectives of the workshop had been to strengthen regional information and data exchange networks on the use of GNSS technology, including various training programmes in GNSS and its applications, and to develop a regional plan of action that would contribute to the wider use of multi-constellation GNSS.

28. The Subcommittee noted with satisfaction that the tenth meeting of ICG and the fifteenth meeting of the Providers' Forum, organized by the Department of State and the University Corporation for Atmospheric Research on behalf of the Government of the United States, was held in Boulder, Colorado, from 1 to 6 November 2015. The Subcommittee also noted that 2015 had been a year of accomplishment for ICG and a fitting commemoration of the tenth anniversary of the establishment of ICG.

29. The Subcommittee noted that the eleventh meeting of ICG would be hosted by the Russian Federation, in Sochi, from 6 to 11 November 2016. The Subcommittee also noted the expression of interest by Japan in hosting the twelfth meeting of ICG in 2017, by China to host the thirteenth meeting in 2018, and by India to host the fourteenth meeting in 2019.

30. The Subcommittee noted that the ICG working groups focused on the following issues: compatibility and interoperability; enhancement of the performance of GNSS services; information dissemination and capacity-building; and reference frames, timing and applications. The Subcommittee also noted that the working groups had made substantive progress in furthering the ICG workplan.

31. The Subcommittee noted the proposal by ICG that the Subcommittee explore, at its next session in 2017, the feasibility of a focused review, within its current agenda item on recent developments in global navigation satellite systems, of issues related to GNSS spectrum protection and interference detection and mitigation. The Subcommittee also noted that the intent behind the proposal was to raise awareness of this issue among States members of the Committee on the Peaceful Uses of Outer Space as part of efforts to achieve the overall goal of promoting effective use of GNSS open services by the global community.

32. The Subcommittee commended the Office for Outer Space Affairs for its outstanding performance in its capacity as the executive secretariat of ICG and its Providers' Forum, and expressed appreciation for the efforts of the Office in bringing attention to the benefits of GNSS throughout the world, particularly for developing nations.

33. The Subcommittee noted with appreciation the financial contributions made by the United States and the European Commission to the Office for Outer Space Affairs in support of GNSS-related activities, ICG, its Providers' Forum and its working groups.

34. The Subcommittee noted that the Global Positioning System (GPS) of the United States continued to be a central pillar in an emerging international system of GNSS. It was noted that GPS accuracy currently averaged a user range error of 70 centimetres. The Subcommittee also noted that new GPS Block IIF satellites had led to incremental increases in overall system performance and a build-up in the number of satellites transmitting the new civilian GPS signals known as "L2C" and "L5".

35. The Subcommittee noted that the United States intended to continue improving the accuracy and availability of GPS through enhanced performance and modernized satellites. The United States continued to broadcast GPS signals free of direct user charges and continued to strongly support international cooperation for peaceful civil, commercial and scientific purposes among current and future GNSS providers.

36. The Subcommittee noted that the civil services of the Global Navigation Satellite System (GLONASS) of the Russian Federation were accessible, effective and fully responsive to the needs of different users, and that the launch of the latest GLONASS-M navigation satellite into orbit completed the space segment of the system. The Subcommittee also noted that the System of Differential Correction and Monitoring, an augmentation to GLONASS, continued to be updated and was to be used in civil aviation for enhancing navigation precision.

37. The Subcommittee noted that thanks to the deployment of infrastructure elements, the provision of GLONASS-based precise point positioning to support applications requiring real-time access was beginning to be organized. The Subcommittee noted that an open service performance standard was being developed, which demonstrated the commitment to providing a basic performance standard for the system's users. It was noted that there was international cooperation aimed at making GLONASS an essential element of the international GNSS infrastructure, with benefits for users worldwide.

38. The Subcommittee noted that three pairs of satellites had been launched in 2015 as part of the Galileo satellite navigation system (Galileo 7 and 8, Galileo 9 and 10 and Galileo 11 and 12), and had been released to their target altitude of 23,500 kilometres (km). It was noted that with six new satellites in orbit, the cruise mode of production, testing and deployment of the full satellite constellation was currently approaching.

39. The Subcommittee noted that the goal, as set by the European Commission, was to have Galileo deliver initial services, including a free public service, an encrypted public regulated service and search-and-rescue services, by the middle of 2016.

40. The Subcommittee noted that the building of the BeiDou Navigation Satellite System (BDS) of China had been steadily pushed forward in accordance with its three-step development strategy, expanding from regional to global coverage and transiting from active to passive location. It was noted that BDS, comprised of 30 satellites, will constitute a complete space constellation by 2020.

41. The Subcommittee noted that the year 2015 had been of particular significance for the BDS establishment, which had witnessed the stable operation of regional services and the formal deployment of a new generation of satellites. Those satellites had higher performance characteristics and were more compatible and interoperable with other navigation satellite systems. The application development process would be given high priority in order to broaden the range of fields in which the BDS and GNSS applications could be used.

42. The Subcommittee noted that India was currently implementing its satellite navigation programme made up of two systems: the GPS-aided Geostationary-augmented Navigation System (GAGAN), which was a satellite-based augmentation system, and the Indian Regional Navigation Satellite System (IRNSS), which was an independent regional system. It was noted that GAGAN signals certified for approach procedures with vertical guidance 1 (APV 1) had been broadcast since May 2015, and that apart from using GAGAN in the aviation sector, India was taking initiatives to use GAGAN in non-aviation sectors.

43. The Subcommittee also noted that the IRNSS constellation was in the implementation phase. It consisted of seven satellites: three in geostationary orbits and four in geosynchronous orbits. The first five IRNSS satellites had been launched, and the IRNSS signal-in-space was successfully being broadcast and received. It was noted that ground systems, including International Laser Ranging Service stations, had been established to support IRNSS operation, and that the full constellation was expected to be completed by April 2016.

44. The Subcommittee noted that Michibiki, the first satellite of the Quasi-Zenith Satellite System (QZSS) of Japan, was currently performing all its functions, and continued to undergo verification of its applications for surveying and personal and car navigation, as well as for new fields such as farming and construction. In addition to positioning and GPS augmentation, QZSS could provide a messaging service that would contribute to disaster management.

45. The Subcommittee also noted that a satellite-based augmentation system service using QZSS, which was an air navigation aid to augment GPS, was scheduled to undergo a functional test and certification process beginning in 2018.

QZSS would be expanded and upgraded to become an operational regional satellite-based navigation system to improve positioning in the Asia-Pacific region.

46. The Subcommittee noted that the Space and Upper Atmosphere Research Commission of Pakistan was actively developing a GNSS programme and had been involved in establishing infrastructure across the country to support users. The Karachi network of continuously operating reference stations had been established to enable precise positioning applications, and GNSS signals were monitored and analysed for ionospheric and tropospheric scientific research.

47. The Subcommittee noted with appreciation that Brazil, the Czech Republic and ESA had reported on their projects and activities focused on helping to bring GNSS technology to the widest possible user community and ensure the participation of international partners in those programmes.

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Draft report

II. United Nations Programme on Space Applications

1. In accordance with General Assembly resolution 70/82, the Subcommittee considered agenda item 5, "United Nations Programme on Space Applications".

2. At the 846th meeting, the Expert on Space Applications made a statement outlining the activities carried out and planned under the United Nations Programme on Space Applications.

3. The Subcommittee noted with satisfaction the work carried out by the Office under the Programme and expressed its appreciation to Takao Doi, the Expert on Space Applications, for his excellent work in furthering the objectives of the Programme.

4. The representatives of Chile, China, France, Germany, Japan, Nigeria, Sri Lanka and the United States made statements under agenda item 5. A statement was also made under the item by the representative of Chile on behalf of the Group of Latin American and Caribbean States. An observer for the World Meteorological Organization (WMO) also made a statement.

5. The Subcommittee heard the following scientific and technical presentations:

(a) "Educational training programme of RCSSTEAP in 2016" by the representative of China;

(b) "Experimental and utilization project of the Japanese Experimental Module 'Kibo'", by the representative of Japan;

(c) "Community of human spaceflight", by the representative of the United States.

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A. Activities of the United Nations Programme on Space Applications

6. The Subcommittee had before it the report of the Expert on Space Applications, outlining the mandate and orientation of the United Nations Programme on Space Applications (see A/AC.105/1107, paras. 1-17). The Subcommittee noted that the Programme for 2015 had been carried out satisfactorily and commended the work accomplished by the Office under the Programme.

7. The Subcommittee noted that the priority areas of the Programme were environmental monitoring, natural resource management, satellite communications for tele-education and telemedicine applications, disaster risk reduction, the use of global navigation satellite systems, the Basic Space Science Initiative, space law, climate change, the Basic Space Technology Initiative and the Human Space Technology Initiative, and biodiversity and ecosystems.

8. The Subcommittee noted that the Office for Outer Space Affairs and the Government of Japan, in collaboration with Japan Aerospace Exploration Agency (JAXA), had launched the United Nations/Japan Cooperation Programme on CubeSat Deployment from the International Space Station (ISS) Japanese Experiment Module (Kibo), known as "KiboCube", in September 2015. The objective of the programme is to promote international cooperation and capacity-building in space technology and its applications under the United Nations Programme on Space Applications by providing opportunities to educational or research institutions in developing countries to deploy small satellites (CubeSats) from the Japanese Experiment Module (Kibo).

9. The Subcommittee welcomed the successful implementation of the third cycle of the Zero-Gravity Instrument Project launched in 2012 as part of the capacity-building activities of the Human Space Technology Initiative (see A/AC.105/1108). The Subcommittee also noted that currently 45 institutions around the world were participating in the project.

10. The Subcommittee noted with appreciation the voluntary contributions, cash and in-kind, provided by various Member States and organizations for 2015 (see A/AC.105/1107, para. 42).

1. Year 2015

Meetings, seminars, symposiums, training courses and workshops

11. The Subcommittee had recommended the approval of the following programme of meetings, symposiums and workshops for 2015 (A/AC.105/1107, annex I):

(a) United Nations/Japan Workshop on Space Weather: Science and Data Products from International Space Initiative Instruments, held in Fukuoka, Japan, from 2 to 6 March;

(b) United Nations/Russian Federation Workshop on the Applications of Global Navigation Satellite Systems, held in Krasnoyarsk, Russian Federation, from 18 to 22 May;

(c) Meeting on the applications of space science and technology for public health, organized by the World Health Organization and the Office for Outer Space Affairs, held in Geneva on 15 and 16 June.

Long-term fellowships for in-depth training

12. The Subcommittee expressed its appreciation to the Government and the Ministry of Industry of Italy, which, through the Politecnico di Torino and the Istituto Superiore Mario Boella and with the collaboration of the Istituto Nazionale di Ricerca Metrologica, had provided fellowships for the eleventh master class on global navigation satellite systems (GNSS) and related applications, which concluded in September, and the twelfth class, which had begun in October 2015.

13. The Subcommittee expressed its appreciation to the Government of Japan for continuing the United Nations/Japan Long-Term Fellowship Programme on Nanosatellite Technologies, in cooperation with the Kyushu Institute of Technology, and noted that the six fellows selected in the 2015 round had begun their studies in October 2015.

14. The Subcommittee expressed its appreciation to the Government of Germany, which, in collaboration with the Center of Applied Space Technology and Microgravity at Bremen University and the German Aerospace Center (DLR), had continued the Fellowship Programme for the Drop Tower Experiment Series and successfully conducted the second cycle of the programme.

2. Year 2016

Meetings, seminars, symposiums, training courses and workshops

15. The Subcommittee recommended the approval of the following programme of forums, meetings, symposiums and workshops for 2016:

(a) United Nations/Costa Rica Workshop on Human Space Technology, to be held in San José from 7 to 11 March;

(b) United Nations/India Workshop on the Use of Earth Observation Data in Disaster Management and Risk Reduction: Sharing the Asian Experience, to be held in Hyderabad, India, from 8 to 10 March;

(c) United Nations/Kenya Workshop on Space Technology and Applications for Wildlife Management and Protecting Biodiversity, to be held in Nairobi from 27 to 30 June;

(d) United Nations/Austria Symposium on Integrated Space Technology Applications for Climate Change, to be held in Graz, Austria, from 12 to 14 September;

(e) United Nations/International Astronautical Federation Workshop on Space Technology for Socioeconomic Benefits, to be held in Guadalajara, Mexico, from 23 to 25 September;

(f) United Nations/Islamic Republic of Iran Workshop on the Use of Space Technology for Dust Storm and Drought Monitoring in the Middle East Region, to be held in Tehran from 5 to 9 November;

(g) United Nations/Nepal Workshop on the Applications of Global Navigation Satellite Systems, to be held in Kathmandu from 5 to 9 December;

(h) United Nations/South Africa Symposium on Basic Space Technology, to be held in South Africa towards the end of this year.

B. Regional and interregional cooperation

16. The Subcommittee noted that the schedule of nine-month postgraduate courses for the period 2014-2016 offered by the regional centres for space science and technology education, affiliated to the United Nations, was annexed to the report of the Expert on Space Applications (A/AC.105/1107, annex III).

17. The Subcommittee recalled that the General Assembly, in its resolution 70/82, had emphasized the importance of regional and interregional cooperation in the field of space activities to assist States in the development of their space capabilities and contribute to the implementation of the 2030 Agenda for Sustainable Development, and had noted in that regard the importance of the equal participation of women in all fields of science and technology.

18. The Subcommittee noted that the ninth meeting of the Council of the Asia-Pacific Space Cooperation Organization (APSCO) had been held in China from 28 to 30 October 2015.

19. The Subcommittee noted that the Seventh Space Conference of the Americas had been held in Managua from 17 to 19 November 2015.

20. The Subcommittee noted that the sixth African Leadership Conference had been held in Sharm el-Sheikh, Egypt, from 1 to 3 December 2015 and that the Conference had also discussed the African space policy and the African space strategy, which would be considered by the African Union in 2016.

21. The Subcommittee noted that the twenty-second session of the Asia-Pacific Regional Space Agency Forum (APRSAF) on the theme "Sharing solutions through synergy in space" had been held in Bali, Indonesia, from 1 to 4 December 2015. The twenty-third session of APRSAF would be held in Manila in November 2016.

22. The Subcommittee was informed of the in-cash contributions received from donors in past years, and member States were encouraged to further support the fulfilment of the objectives of the international community in supporting the development of capacity in space science and technology.

IV. Matters relating to remote sensing of the Earth by satellite, including applications for developing countries and monitoring of the Earth's environment

23. In accordance with General Assembly resolution 70/82, the Subcommittee considered agenda item 7, "Matters relating to remote sensing of the Earth by satellite, including applications for developing countries and monitoring of the Earth's environment".

24. The representatives of China, Egypt, India, Indonesia, Iran (Islamic Republic of), Italy, Japan and the United States made statements under agenda item 7. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

25. The Subcommittee heard the following scientific and technical presentations:

(a) "NOAA meteorological satellite update", by the representative of the United States;

(b) "PSIPW: Eighth Award — invitation for nomination", by the observer for PSIPW.

26. In the course of the discussions, delegations reviewed national, bilateral, regional and international programmes on remote sensing, notably in the following areas: monitoring climate change; disaster management; volcanology and seismology; managing ecosystems and natural resources; monitoring air and water quality for aerosols and pollutants; meteorology and weather forecasting; agriculture; irrigation and drought monitoring; monitoring deforestation and forest degradation, coastal zones, watershed development and land use; ice-cover and glacial monitoring; oceanography and temperature monitoring; rural development, urban planning; infrastructure development and oil and gas pipeline monitoring; global health; and food security and crop yield quantification.

27. The Subcommittee noted the ongoing capacity-building efforts by developing countries in using Earth observation to fight poverty, improve quality of life and advance their socioeconomic development through a rational and sustainable exploitation of resources. In that regard, the Subcommittee also noted that there had been an increase of collaborative efforts of developing countries with the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER) to build disaster management capacity and disseminate information to policymakers at the national level.

28. The Subcommittee noted that the use of Earth observation data by decision makers at the national and local levels in developing countries had resulted in the delivery of more targeted and effective social services, while at the same time achieving significant cost reductions.

29. The Subcommittee noted efforts to promote the development of applications using Earth observation data and to foster commercial and governmental channels to disseminate such applications as a way of encouraging the increased use of satellite-derived data by decision makers and promoting local and regional economic development.

30. The Subcommittee noted the commitment of member States to cooperating internationally in the collection, processing and dissemination of Earth observation data and applications, in particular for the benefit of developing countries, to promote well-informed decisions. The Subcommittee noted in that regard various regional and international initiatives including the Regional Visualization and Monitoring System (SERVIR) and the Space Applications for Environment (SAFE) initiative of APRSAF.

31. The Subcommittee noted a number of forthcoming launches of next-generation Earth observation satellites, to complement existing operational Earth observation

satellites, that provided high-resolution, high-accuracy and sustained observation of the Earth environment. The Subcommittee also noted plans of member States to jointly develop and build such satellites. Combined with ground-based systems, all of those initiatives could further improve the monitoring of the Earth environment.

32. The Subcommittee noted the continued support for the activities of the Committee on Earth Observation Satellites (CEOS) and that the Japan Aerospace Exploration Agency had taken up the chairmanship of CEOS for 2015. The Subcommittee also noted that the thirtieth plenary session of CEOS would take place in Brisbane, Australia, in October 2016.

33. The Subcommittee noted the continued support for the activities of the Group on Earth Observations (GEO) and that it had developed a 10-year implementation plan to promote informed decision-making based on Earth observation data and applications, which had been endorsed at its Ministerial Summit held in Mexico City in November 2015. The Subcommittee also noted that the next GEO ministerial summit would be held in Saint Petersburg, Russian Federation, in November 2016.

XII. Examination of the physical nature and technical attributes of the geostationary orbit and its utilization and applications, including in the field of space communications, as well as other questions relating to developments in space communications, taking particular account of the needs and interests of developing countries, without prejudice to the role of the International Telecommunication Union

34. In accordance with General Assembly resolution 70/82, the Subcommittee considered agenda item 15, "Examination of the physical nature and technical attributes of the geostationary orbit and its utilization and applications, including in the field of space communications, as well as other questions relating to developments in space communications, taking particular account of the needs and interests of developing countries, without prejudice to the role of the International Telecommunication Union", as a single issue/item for discussion.

35. The representatives of Indonesia, South Africa and Venezuela (Bolivarian Republic of) and the representative of Chile, on behalf of the Group of Latin American and Caribbean States, made statements under agenda item 15. During the general exchange of views, statements relating to the item were made by representatives of member States.

36. The Subcommittee noted with appreciation the information provided in the annual report for 2015 of the Radiocommunication Bureau of ITU on the use of the geostationary satellite orbit and other orbits (see www.itu.int/ITU-R/space/snl/report), as well as other documents referred to in conference room paper A/AC.105/C.1/2016/CRP.16. The Subcommittee invited ITU to continue to submit reports to it.

37. Some delegations expressed the view that the geostationary orbit was a limited natural resource that was at risk of becoming saturated, thereby threatening the sustainability of space activities in that environment; that its exploitation should be

rationalized; and that it should be made available to all States, under equitable conditions, irrespective of their current technical capabilities, taking into particular account the needs of developing countries and the geographical position of certain countries. Those delegations were also of the view that it was important to use the geostationary orbit in compliance with international law, in accordance with the decisions of ITU and within the legal framework established in the relevant United Nations treaties.

38. Some delegations expressed the view that the geostationary orbit, as a limited natural resource clearly in danger of saturation, must be used rationally, efficiently, economically and equitably. That principle was deemed fundamental to safeguarding the interests of developing countries and countries with a certain geographical position, as set out in article 44, paragraph 196.2, of the Constitution of ITU, as amended by the Plenipotentiary Conference held in Minneapolis, United States, in 1998.

39. Some delegations expressed the view that the geostationary orbit provided unique potential for access to communications and information, in particular for assisting developing countries in implementing social programmes, educational projects, dissemination of knowledge and for providing medical assistance.

40. The view was expressed that the current regime for exploitation and utilization of the geostationary orbit provided opportunities mostly to countries with financial and technical capabilities and, in that connection, there was a need to take anticipatory measures to address the potential dominance of such countries in the utilization of space in order to address the needs of developing countries and of countries with a special geographical situation, such as those in equatorial regions.

41. The view was expressed that the utilization by States of the geostationary orbit on the basis of "first come, first served" was unacceptable and that the Subcommittee, with the involvement of ITU, should therefore develop a regime guaranteeing equitable access to orbital positions for States.

42. Some delegations expressed the view that, in order to ensure the sustainability of the geostationary orbit, as well as to assure guaranteed and equitable access to the geostationary orbit according to the needs of all nations, taking into particular account the needs and interests of developing countries, it was necessary to keep that issue on the agenda of the Subcommittee and to explore it further, through the creation of appropriate working groups and legal and technical intergovernmental panels, as necessary.

XIII. Draft provisional agenda for the fifty-fourth session of the Scientific and Technical Subcommittee

43. In accordance with General Assembly resolution 70/82, the Subcommittee considered agenda item 16, "Draft provisional agenda for the fifty-fourth session of the Scientific and Technical Subcommittee".

44. The Subcommittee noted that the Secretariat had scheduled the fifty-fourth session of the Subcommittee to be held from 30 January to 10 February 2017.

45. The Subcommittee also noted that during the consideration of the draft provisional agenda for the fifty-fourth session of the Subcommittee by the Working Group of the Whole, the Working Group had recommended that in view of the adoption of the 2030 Agenda for Sustainable Development at the United Nations summit for the adoption of the post-2015 development agenda, held from 25 to 27 September 2015, the current agenda item of the Subcommittee entitled "Space technology for socioeconomic development in the context of the United Nations Conference on Sustainable Development and the post-2015 development agenda" be renamed "Space for sustainable socioeconomic development".

46. The Subcommittee noted that, in accordance with General Assembly resolution 70/82, it would submit to the Committee its proposal on the draft provisional agenda for the fifty-fourth session of the Subcommittee and recommended that the following items be included in the draft provisional agenda:

1. Adoption of the agenda.
2. Statement by the Chair.
3. General exchange of views and introduction of reports submitted on national activities.
4. United Nations Programme on Space Applications.
5. Space technology for sustainable socioeconomic development.
6. Matters relating to remote sensing of the Earth by satellite, including applications for developing countries and monitoring of the Earth's environment.
7. Space debris.
8. Space-system-based disaster management support.
9. Recent developments in global navigation satellite systems.
10. Space weather.
11. Near-Earth objects.
12. Use of nuclear power sources in outer space.

    (Work for 2017 as reflected in the extended multi-year workplan of the Working Group (A/AC.105/1065, annex II, para. 9))
13. Long-term sustainability of outer space activities.
14. Examination of the physical nature and technical attributes of the geostationary orbit and its utilization and applications, including in the field of space communications, as well as other questions relating to developments in space communications, taking particular account of the needs and interests of developing countries, without prejudice to the role of the International Telecommunication Union.

    (Single issue/item for discussion)
15. Draft provisional agenda for the fifty-fifth session of the Scientific and Technical Subcommittee, including identification of subjects to be dealt with as single issues/items for discussion or under multi-year workplans.

47. The Subcommittee also noted that in accordance with the agreement reached by the Subcommittee at its forty-fourth session in 2007 (A/AC.105/890, annex I, para. 24), the symposium at the fifty-fourth session of the Subcommittee in 2017 was to be organized by IAF and that the topic of symposium would be communicated to and decided upon by the Committee at its session in June 2016.

48. The view was expressed that due to the unique position of the Subcommittee and the Committee in promoting international cooperation in using outer space for peaceful purposes, cooperation with other United Nations entities should be strengthened in order to promote the use of space science and technology and their applications for peace and security, in particular for combating terrorism. That delegation was further of the view that the Subcommittee should introduce a new agenda item entitled "Space system-based counter-terrorism support" and that in order to combat the threat of international terrorism, the spacefaring nations should make available, at no cost, high-resolution imagery to countries with no such capabilities, to combat terrorism.

49. The view was expressed that the above-mentioned proposal should be duly taken into account for further study by the Subcommittee and the Committee since combating terrorism was of utmost priority.

50. The Subcommittee welcomed with appreciation the compendium of rules of procedures and methods of work related to the Committee on the Peaceful Uses of Outer Space and its subsidiary bodies, contained in conference room paper A/AC.105/C.1/2016/CRP.5, prepared by the Secretariat in accordance with the request by the Subcommittee and the Committee in 2015.